crystal frequency multiplier

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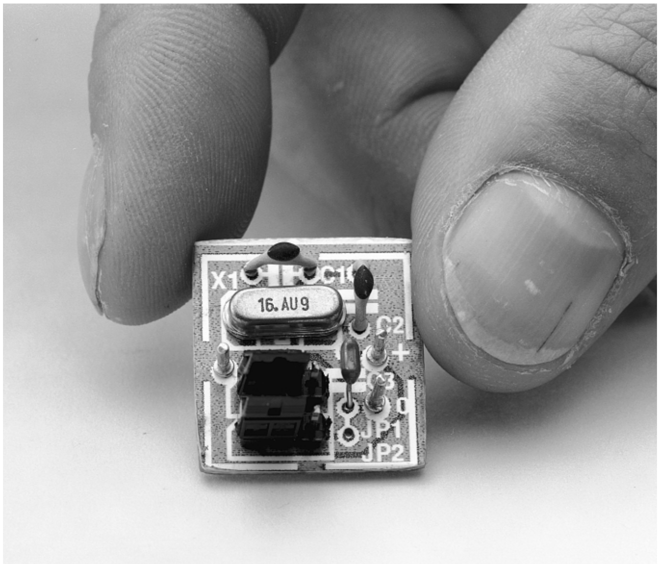
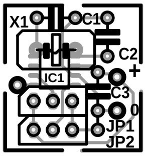
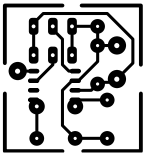






Components list

Capacitors:
C1,C2 = 33 p cer.
C3 = 100 n cer.

Semiconductors:
IC1 = ICS501M

Miscellaneous:
X1 = crystal approx. 5–27 MHz
JP1,JP2 = 3-way jumper

H. Bonekamp

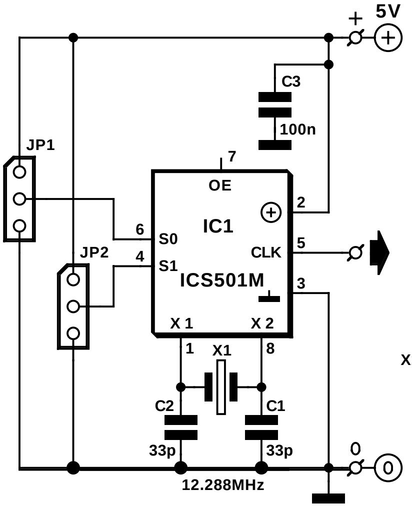
Crystals for operation above 20 MHz are invariably cut to an overtone (harmonic), which may be the third, fifth, or seventh. In other words, the fundamental frequency of such a crystal is a third, fifth or seventh of the operating frequency. If, however, an overtone crystal is used in an oscillator designed for operation on the fundamental, it is doubtful whether the wanted frequency will be generated. In most such cases, there are difficulties that make it necessary for the oscillator circuit to be modified.

One practical solution for such problems is offered by the circuit in the diagram, which enables frequencies up to 160 MHz to be generated with the use of a fundamental-frequency crystal. The output signal is virtually free of any jitter.

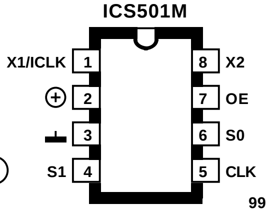
The circuit makes use of an IC that contains not only an oscillator but also a phase-locked loop (PLL) controlled frequency multiplier. The associated ROM stores nine different multipliers, which may be selected by appropriate placing of the jumpers in JP_1 and JP_2 as shown in the table. A 0 in the table indicates that the jumper is linked to earth; a 1, that it is linked to the +5 V line; and a × that it should be left open.

The circuit may conveniently be built on the printed-circuit board shown, which is not available ready made.

The circuit draws a current of about 20 mA.



JP1	JP2		X1 min
0	0	4 x	
0	x	5.3125 x	20 MHz
0	1	5 x	
x	0	6.25 x	4 MHz
x	x	2 x	
x	1	3.125 x	8 MHz
1	0	6 x	
1	x	3 x	
1	1	8 x	



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